MULTIPHOTON PHOTOACOUSTIC SPECTROSCOPY

SYSTEM AND METHOD

ABSTRACT OF THE DISCLOSURE

A system and method for performing multispectral imaging locates features of interest in a specimen using a technique known as multiphoton photoacoustic spectroscopy. In this technique, a tunable high-power laser is used to initiate multiphoton excitation events which are then detected as an acoustic signal using a sensor such as an ultrasonic piezoelectric transducer. The transducer signal is processed to form a normalized MPPAS signal intensity which may then be used as a basis for forming a spectral image. Unlike other spectroscopies, MPPAS is able to monitor non-fluorescent species based on non-radiative relaxation of the light-absorbing species in the specimen. In addition, since the majority of energy imparted to the light-absorbing molecules is released through non-radiative pathways, sensitive measurements of even fluorescent molecules can be performed. The system and method may be applied to detect malignant cells in tissue samples although other uses are contemplated.